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RESEARCH REPORT

COMBATING LOW INTENSITY CONFLICTS IN LATIN AMERICA
THE ENGINEER'S ROLE

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Combating Low Intensity Conflicts In Latin America

The Engineer's Role

by
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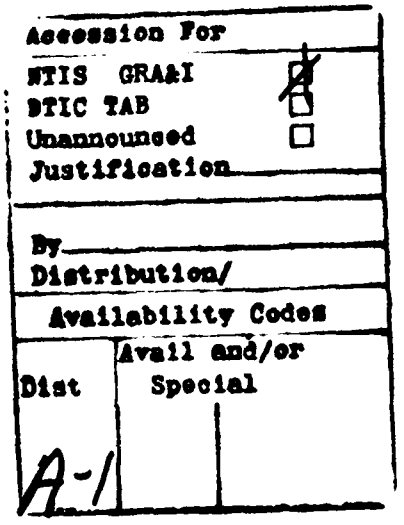

EXECUTIVE SUMMARY

TITLE: Combating Low Intensity Conflicts in Latin America: The Engineer's Role

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As one moves down the spectrum of conflict from global war to "small" wars, normally defined as low intensity conflicts (LIC), the probability of becoming involved in such a conflict increases. The United States military has begun to take a hard look at these conflicts--how to prevent them, if possible, and how to win them, if prevention fails. History has shown that the best way to win a low intensity conflict is to prevent it from happening by improving the living conditions of the people involved. Failing that, one of the keys to winning is to have access to the infrastructure that is needed to support the deployment and employment of a military force. The engineer plays a major role in each of these actions.

This study takes a look at low intensity conflicts in Latin America from an engineer's perspective. Problems associated with providing the infrastructure to support power projection are discussed, lessons learned from exercises conducted in the region are reviewed, and recommendations to improve the military's and the engineer's ability to respond to conflicts in the region are provided.

BIOGRAPHICAL SKETCH

Lieutenant Colonel Jack T. Baker (M.S., Industrial Engineering, Ohio State University, M.B.A., Wright State University) is a career engineer. He has had assignments at all levels of command to include: engineering program manager for the construction of the bases that supported the beddown of the Ground Launched Cruise Missile in Europe, Chief of the USAFE Engineering and Services Management Assistance Team, and Commander of the 81st Civil Engineering Squadron, RAF Bentwaters/RAF Woodbridge, England. Lieutenant Colonel Baker is a graduate of the Air War College, class of 1989.

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CHAPTER I

INTRODUCTION

What started out to be an analysis of the engineer's ability to respond to a low intensity conflict (LIC) turned out to be a study of a much larger issue--is the United States prepared to fight such a conflict? During the course of my research, I found that nation building, the engineer's role in life, was one of the best ways to prevent low intensity conflicts and even more importantly was one of the keys to winning if prevention failed.

While there is little agreement on a good definition of a low intensity conflict, there are several themes that run through the "tons" of literature discussing the phenomena. These themes are the basis of my analysis. First, there is a consensus that one of the best ways to fight a LIC is to prevent it from happening; and that the best way to accomplish that goal is through the improvement and construction of facilities such as roads, sanitation systems, utility systems, schools, clinics, etc. Second, if the efforts to prevent a conflict fail, that same infrastructure (roads, utilities, ports, airfields) plays a major role in determining the winner or loser. Third, those charged with responding to a LIC better plan on a "come as you are" war. The nature of the conflict will no doubt preclude long build ups and if existing airfields, power sources, ramp space, and all the other facilities that are

needed to support deployed forces are not available--one better make other plans. That statement is not intended to be facetious; history has shown that inadequate infrastructure, the tremendous amount of airlift/sealift required to bring it with you, and the time it takes to build it, are major factors in determining response options. Finally, forces that are called upon to respond to a low intensity conflict need to be familiar with the area.

While these conclusions appear to be self-evident, if you look at our current policies in Latin America, there are major shortfalls in each of the areas. Hopefully this analysis will shed some light on those issues, raise some questions for further study, and help focus attention on an area that some have described as a powder keg. My paper will include:

-- a discussion of what constitutes a low intensity conflict and what mission the military, and the engineer in particular, plays in preventing or winning it;

-- a review of engineering experiences in Latin America during combat and during exercises; and

-- an analysis of lessons learned and some recommendations to better prepare the engineer for this high probability, low priority type of war.

CHAPTER II

THE ENGINEER'S WAR FIGHTING MISSION

War Fighting

Major General George E. Ellis, Director of Engineering and Services, in an article describing his four principles of excellence stated, "My most important principle is preparing for war." He goes on to state, "We must not be distracted by routine 'peacetime emergencies' and lose our critical wartime focus." (1)

During the last five to ten years, more and more emphasis has been placed on the engineer's war fighting role; however, the day to day task of operating and maintaining our peacetime infrastructure has prevented many engineers from looking back to see where we have been or looking forward to see where we are going. Fortunately, several excellent papers have been prepared that describe our warfighting role. A 1984 Air War College Research Report prepared by LTC Floyd Ashdown entitled, "A History of the Warfighting Capabilities of Air Force Civil Engineering" describes the evolution of the military engineer from ancient times through WWII and introduces the development of warfighting capabilities in Air Force Civil Engineering from 1947 to 1983. Col Ashdown concludes:

> Engineering warfighting capability has evolved from a very limited capability existing in 1947 to a very credible capability in 1983, but he cautions, Air

Force civil engineers must be careful not to let these gains slip away and must use the lessons of the past to develop new initiatives to further improve its war-fighting capabilities. (2)

In 1985, two students at the Air Force Institute of Technology prepared a thesis entitled, "A History of Air Force Civil Engineering Wartime and Contingency Problems from 1941 to the Present." The authors noted that as of August 1985, approximately 75 percent of current Air Force Civil Engineering officers had entered active duty since 1971, and that the number of personnel with war experience was low and obviously decreasing each year. They go on to present a very thorough and well documented history of civil engineering and its support of the Air Force's mission through Vietnam. Some of the major lessons learned in Vietnam were summarized in their report and I submit they are still relevant today. (3)

A. Air Force Civil Engineers (AFCEs) should expect the worst possible conditions and all contingency plans should be based on actual site surveys.

B. Company grade AFCE officers need to be familiar with heavy construction techniques and keep abreast of new technology.

C. Air Force Civil Engineering should be a participant in the development of contingency plans.

D. In country logistic supply channels should be established as soon as possible.

E. The use of pre-engineered and prefabricated structures should be maximized to cut construction times.

F. Flexible programming avenues should be available for contingency support.

G. Troop construction and turnkey projects (with civilian contractors) were the most effective method of providing contingency construction.

Their thesis concludes by listing several recommendations and making two very powerful points. First, they quote a previous Director for Operations, Joint Chiefs of Staff, LtGen Gast:

> The challenge to the Engineering and Services community is to sift carefully through the after-action reports and the experiences of our people to determine our true abilities to respond. Intense review and profiting from past challenges will enable us to more effectively provide the operating support necessary to sustain any future effort. (4)

And finally, they emphasized the importance of continuing to update this research. (5)

The conclusions reached by these individuals are very important, as they very carefully explored the experience of the Air Force engineer up to the late 1970s. Unfortunately, they had to leave off where most of the other military historians leave off--Vietnam. The major questions which must be asked now are, "What type of war should we be preparing for? Do the lessons of the past still apply? Are we preparing for the last war?" LTC Philip R. Harris of the Army Corps of Engineers in a very thought-provoking article in the July 1987 Military Engineer notes:

> We must now look at being able to conduct military operations worldwide. This is a substantial mission change from the predominate view which Europe occupied in the past. However, have we adequately considered the engineering support that will be necessary to commit and sustain such a force? (6)

His question becomes even more difficult to answer when you look at possible contingencies in third world countries. He concludes that most third world countries do not have the national infrastructure (roads, airfields, ports) to sustain our armed forces. In fact, the quantities of supplies necessary to commit and sustain our forces will overtax their meager infrastructure and these shortcomings will dictate our response. (7)

Recently, the Air Force has started to take a hard look at these issues and to examine this "thing" called a low intensity conflict. In a 1986 document called "The Air Force Role in Low-Intensity Conflicts," the author notes:

> The US Air Force needs to consider the question of effective assistance to third world countries as part of a basic shift in strategic thinking. Our primary strategic planning effort has been to insert large numbers of U.S. ground and air forces into an area to accomplish our policy objectives. That planning effort must continue, but with the understanding that inserting a major U.S. force in any third world region is unlikely...our focus for planning needs to shift to providing effective leverage for third world friends and allies by form of arms sales, training, or even small specialized forces. (8)

I submit that one of the keys to that effort is determining the type of infrastructure that is required to support this shift in strategy. Therefore the thrust of this paper will be to look at the engineer's role in a low intensity conflict, and to determine whether we have the doctrine, force structure, and training needed to respond to this very different type of war.

The Engineer's Tasks

What is the military engineers' wartime mission and what are their capabilities? While the engineer's tasks will remain basically the same regardless of the level of conflict, the size of the operation (i.e., conventional war in Europe to invasion/rescue attempt in Grenada) will in part determine the importance and scope of the tasks to be accomplished. Likewise, the location of the operation (i.e., force deployment to an established base in Europe versus a civil action project in Honduras) will also help determine the relative importance of the task. And finally, the timing (i.e., construction of an airfield to support a deploying force to working overtime to support the raid on Libya) will further dictate the level and type of civil engineering support. The engineering tasks to be performed are:

> Force beddown: providing facilities for increases in force. This support may consist of converting military family housing units at a main operating base in Europe to additional dormitory space, or the procurement of house trailers and the erection of portable facilities at a colocated operating base in Europe, or erecting relocatable facilities at a bare base operation, or providing a tent city for an exercise or short notice deployment.

Operation and Maintenance: of utilities and facilities and the provision of services such as entomology and refuse collection. It may also consist of the operation of mobile generators, water plants, portable showers and the maintenance of pre-engineered or portable facilities.

Construction: whether it be the design and construction of a multimillion dollar semi-hardened operations facility that can take five years from initial requirements identification to actual acceptance from the contractor, or the erection of a plywood floor and frame for a tent.

These tasks can be either peacetime or wartime tasks and vary in complexity, magnitude, and method of accomplishment. Work can be completed by military engineers or by civilian contractors, or by some combination of both. The time frame can be from five hours to five years and work sites can range from an existing base to a dirt road in a jungle. In a post attack environment, two additional tasks become paramount:

Bomb damage repair: the scope can range from repair of facility/utility systems at a main operating base in Europe to the replacement of a broken window caused by a rock thrown by a peaceful demonstrator. With no attempt at theatrics, the range of wartime facility repair can range from those extremes.

Rapid Runway Repair (RRR): the most obvious, most important, most critical, and most urgent war tasking. While I do not mean to make light of or relegate other tasks to a secondary role, the overriding mission after an attack is to launch and recover aircraft. The importance of providing that pavement cannot be over-emphasized.

Force Structure

What is the force structure available to perform these tasks? The manpower, the team composition, used to accomplish these tasks is as varied as the tasks. Depending upon the scope and the location of the job, you may find civilian U.S. government employees, host country civilians (United Kingdom especially), contractors (played a critical role in Southeast Asia), Army Corp of Engineers, Guard or Reserve forces, or an Air Force military engineer, either as a member of a Red Horse (mobile, heavy construction) squadron or Prime BEEF (mobility) team performing the task. This organizational structure provides flexibility but also complicates contingency planning and training since any one of those engineers could be called upon to respond to any level of conflict. Civilian contractors played a major role in the construction and subsequent operation and maintenance of airfields in Thailand and Vietnam and continue to operate bases in Greece, Spain, Panama, and even in the United States. Their contribution can not be overlooked and must

be factored into any contingency plan being formed. Second, the role that Guard and Reserve engineers play is very important. These units not only have many skilled craftsmen that perform military civil engineering tasks for a living, they also provide much of the engineering manpower needed to satisfy wartime engineering requirements. The role that the Army Corp of Engineers plays is not only very important; it remains controversial.

The roles and missions of Air Force and Army engineers are spelled out in Army Regulation 415-30 and AF Regulation 88-12. Although the division of labor is spelled out in those regulations, history has shown that such distinctions are hard to make, and any number of examples can be given which highlight the difficulty in establishing hard and fast rules. During the Lebanon Crisis in 1958, Army assistance for a water line construction was obtained only after "extreme measures" were taken to secure a company of Army engineers.(9) In describing the Army's support of USAFE's build-up in Europe in response to the Berlin crisis, Brigadier General Oren A. Price, Director of Civil Engineering USAFE wrote, "Support by Army Engineer troops was something less than satisfactory." (10) Finally, in Vietnam a joint logistics review board noted the Army had no dedicated units in its active force structure to meet Air Force overseas construction requirements.(11) I do not intend to belabor this point for it is not within the scope of this paper. An Air Command and Staff College report by

LTC Engelbach describes the history behind this situation and proposes several alternatives. Englebach concludes:

> Based on past experience it appears probable that the Air Force will again be taking care of its own construction requirements in the next contingency and that AF engineers are not trained for actual construction as thoroughly as they might be if contingency construction were a clearly recognized mission. (12)

For the purpose of this paper, I will key on the joint responsibility of Army and Air Force engineers in Central and South America because much of our experience in this region comes from Army Guard, Reserve, and Corp of Engineer exercises. Let it suffice that the issue of roles and missions in the joint environment has come a long way from the experiences in Vietnam and the importance of both in the low intensity environment will become obvious.

The strength of the Air Force Civil Engineering "bluesuit" workforce is based upon its war fighting mission. As noted earlier, the two reports describing the history of Air Force Civil Engineering do an excellent job of describing why and how the Prime BEEF (Base Engineer Emergency Force) and Red Horse (Rapid Engineer Deployable, Heavy Engineering) team structure evolved. In 1964, Prime BEEF was organized under a four team concept and emphasized teams that maintained base operations before, during, and immediately following an attack. There was a subset of this team structure designed to deploy anywhere they were needed. The BEEF-F team (flyway) was a 60-man team manned to perform light construction, maintenance, and repair. Prime BEEF

teams were used extensively in Southeast Asia to build aircraft revetments, operate existing bases, and assist private contractors, Red Horse, and the Army Corp of Engineers in the construction of airfields and support facilities. In 1979, the Prime BEEF structure was changed from the Vietnam organization emphasizing home base recovery and deployed force beddown to one that emphasized wartime roles such as bomb damage repair (BDR) and Rapid Runway Repair (RRR). This structure had several disconnects between team structure and contingency plan tasks and was again reorganized in 1983. This structure consisted of four major teams: 1) 15-man teams to operate at colocated operating bases or to augment main operations bases; 2) a 45-man team of various specialists for base support and recovery; 3) a 20-man team for limited support; and 4) a 12-man equipment team designed for RRR. In addition, there were 22 specialized teams that could be added or subtracted to respond to various taskings. One of the major problems associated with this team structure was the lack of unit integrity and the logistics problem associated with collecting all these various teams at one place to deploy them. In addition, since these teams were assigned to functional responsibilities, team training was task oriented and not team oriented, and often failed to take into consideration environmental differences. Because of these inherent problems and the strong belief that the combat support package should be designed and postured to the

combat organization it supports, changes to the Prime BEEF structure have been made.(13) The force composition now revolves around a 200-person team, dedicated to its parent deploying wing and designed to provide base operating support for 12-hour shifts. The team is subdivided into 50 person subsets to provide varying levels of support to specific tasks. The Air Force civil engineering heavy construction capability lies with Red Horse. The Air Force has four active duty Red Horse squadrons, two teams in the Guard, and one in the Reserves. Red Horse was developed in 1966 and served with distinction in Vietnam. Ashworth describes its many accomplishments in his report. After the war, the teams were moved around but their team structure and missions remained basically the same and the accomplishments of Red Horse squadrons can be seen from Korea to Europe and from bases in Southwest Asia to the jungles of Honduras. Although limited in numbers, Red Horse remains the Air Force Civil Engineering heavy construction capability.

Along with the team structure, the equipment that the engineers have to accomplish their mission is critical. In addition to the tools of the various trades and heavy equipment sets that are prepositioned (particularly in Europe) to perform rapid runway repair, the Air Force has a limited ability to provide pre-engineered/bare base facilities for deployment or contingency purposes. One of the most significant developments to come out of the Vietnam

conflict was the bare basing concept. This concept consisted of prepackaged support kits (called HARVEST EAGLE and HARVEST BARE kits) that could be deployed to support contingency operations. There are 12 of these kits (four in Europe, four in PACAF, four in Conus) each having sufficient tents, cots, generators, lighting, etc., to support an 1100-person beddown. The problems associated with these kits are many: availability, airlift required to support them, and training to use them being the most critical. (14) In addition, the concept assumes that existing airfields and water sources are available. To further complicate the issue, a typical civil engineering squadron will only see one of these units in a training environment once every three to four years.

Capabilities

Given the team structure and equipment, how prepared is the civil engineer to perform his wartime mission? The answer to that question depends on a number of factors, such as: what task is to be performed, at what level of conflict, in what theater, and how much time is available?. For example, an in-place civil engineering squadron in West Germany, with pre-positioned RRR equipment and a solid unit training program, can and does fix craters in runway pavements to meet U.S. and NATO criteria. Well-defined tasks, in a European scenerio, are practiced and can be accomplished. Construction, and subsequent maintenance and

repair of facilities, in a large contingency "i.e., Vietnam" can be accomplished, given sufficient time. Deployments to bare base locations are exercised routinely and are successful. However, these deployments are not without their problems and a limited number of civil engineers have had experience in that type of environment. In short, we are better prepared to deploy to Europe, with an existing infrastructure, than we are to deploy to areas, specifically Central and South America, that have poorly developed infrastructures.

Therefore, the purpose of this paper is to look at low intensity conflicts, the least defined but most likely form of conflict. I will examine the best way to fight such a conflict and the tasks that civil engineering will be called upon to perform. I will look at our experiences in Central and South America in order to assess whether our existing structure (team organization, equipment, training) are designed to fight this type of war.

CHAPTER III

LOW INTENSITY CONFLICT

Before one can discuss the engineer's mission in a low intensity conflict there are several issues that must be addressed:

First, we need to define a low intensity conflict, a difficult task at best.

Second, we need to define the Air Force's role in that type of conflict.

And finally, we have to be able to tell the engineer what we want him to accomplish. He needs to know: How many people and what type of aircraft will be involved? What facilities are required? How long will the support be required? And finally, how long will he have to provide the required support--six days or six months?

Once the engineer knows the what and when he has to address the hows:

First, he must know what type of facilities are in the area--what will the current infrastructure support? Is equipment and material available, will it have to be shipped or flown in? What are the construction practices in the area and is there a local labor force?

Second, he must determine who will accomplish the task. Will the manpower come from in-place forces, deployed forces, or will some other organization (i.e., the Army or even civilian contractors) be called upon to perform the mission?

Finally, once those questions are answered he can set the plan in motion. He can determine team structure, equipment, and material requirements.

The engineer wants well-defined problems, well-established timelines, established milestones, and clear cut taskings. Unfortunately, none of those things define a low intensity conflict and therein lies one of the biggest problems. One needs to understand that the range of conflict is wide and the engineer's range of expected responses will be wider, especially when you are looking at low intensity conflicts.

Low Intensity Conflicts

A Definition

There are many definitions of low intensity conflict but all have several common threads. The Joint Chiefs of Staff in a February 1988 message defines low intensity conflict:

> Political-military confrontation between contending states or groups below conventional war and above the routine, peaceful competition among states. It involves protracted struggles of competing principles and ideologies. LIC ranges from subversion to the use of armed force. It is waged by a combination of means employing political, economic, informational, and military instruments. Low intensity conflicts are

often localized, generally in the third world, but contain regional and global security implications. (1)

Another definition of LIC by Professor Sam Sarkesian of Loyola University states:

> Low-intensity conflict--refers to the range of activities and operations on the lower end of the conflict spectrum involving the use of military or a variety of semi-military forces (both combat and non combat) on the part of intervening power to influence and compel the adversary to accept a political - military condition.(2)

In his book, "The Air Force Role in Low Intensity Conflict," LTC Dean takes these definitions and presents the conflict in terms of the types of military operations that correspond to the various levels of war: (3)

LOW INTENSITY					MID INTENSITY		HIGH INTENSITY	
Noncombat Force Employment	One-Time Operations	Advisory Assistance	Cadre for Host Forces	Combat Units with Host Forces	Unilateral Inter-vention	Limited Conventional War	Unlimited Conventional War	Nuclear War
-Joint exercise -Show of force -Increased alert -Peace keeping -Combat support -Intel-ligence -Logistics -Foreign military sales	-Son Tay-type raids	-Short term military training teams -No combat -Expedited foreign military sales	-Longer term teams in field	-Battalion/ squadron size units -Special Operations Force units	-Carrier battle group -Special-ized joint units -Short term specific goal established	-Full Rapid Deploy-ment Joint Task Force employ-ment		

By looking at low intensity conflict in terms of operational responses and limiting parameters (time, level of resources involved, geography, and related variables) one can see the depth and breadth of the type of support the Air Force's engineers may be asked to provide. LIC remains a somewhat nebulous term but most agree the potential for low intensity conflict will increase. In fact, many have looked at the spectrum of conflict and have concluded as one moves down the scale of conflict (from nuclear to noncombat force employment) the probability of such conflict increases.

The Armed Force's Role

Given the spectrum of LIC, where does the armed force's mission fall? A 1988 Center for Low Intensity Conflict document titled "Joint Operational Concept for Tactical Force Protection" states the U.S. armed force's mission falls into four general categories: peacekeeping, insurgency/counterinsurgency, combating terrorism, and peacetime contingency operation.(4) Peacekeeping is defined as military operations conducted in support of diplomatic efforts to achieve, restore, or maintain peace in areas of potential or actual conflict. Peacetime contingency operations are defined as politically sensitive military operations normally characterized by the short term rapid projection or employment of forces in conditions short of conventional war, i.e., strike, raid, rescue, recovery,

demonstration, show of force, unconventional warfare and intelligence operations.

LTC Dean's essay continues and notes that in order to be effective in LIC the Air Force must be flexible enough to act at three levels: assistance, integration of forces and intervention.(5) At the assistance level, LTC Dean's emphasis is on such actions as Air Force mobile training teams and military assistance and advisory groups. His thesis deals with providing aircrew training and other equipment related training--in essence military training teams. While I agree with the thesis, I would argue that at the assistance level the construction of infrastructure and other civic action projects also play a major assistance role. As Army FM-100 states:

> Much of our doctrine on low intensity conflict emphasizes the probability of conflict developing in Third World countries. That is, we see the conditions in poorly developed countries producing a vulnerable population which can develop and encourage insurgency. One of the solutions to this problem is to help spread government influence and encourage national unity by providing the basic infrastructure to aid economic development. The engineer can play a key role in this effort by building roads (links between areas, providing both economic and military benefits), airstrips, and port facilities. Additionally, vertical construction such as schools, hospitals, utility systems, water and sewage all play a major role in stabilizing governments (and nations) and also have military applications.(6)

LTC Dean notes in the area of integrating forces that he is discussing the introduction of military forces to provide training to host forces in a combat role. He notes this is an area that needs a tremendous amount of study and that our options are limited. I would note that one of the

limiting factors is the availability of infrastructure that is required to support those forces.

Finally, he notes that we may be required to intervene with a "larger" force. In this area he emphasizes such forces as the Air Force's airlift capability as well as SAC's strategic projection force (SPF) to deliver conventional bombs. He concludes this section by noting that basing would be a problem. "Even with access to bases (a whole problem in itself), supporting a US fighter squadron is an expensive and demanding proposition--not like deploying to European bases where everything is available."(7) I suggest that conclusion is critical and is the key to the entire problem.

The Engineer's Role

If you look at the mission (preventing insurgency/ counterinsurgency, combating terrorism, peacekeeping, peacetime contingency), and the level of involvement (assistance, integration of forces, and intervention), the engineer has a key role to play in each. In the area of insurgency/counterinsurgency, the role of the US forces will be to assist indigenous governments to maintain law and order and to stabilize the situation. The engineer's objectives could range from a civic action project to help eliminate the cause of the insurgency, to the beddown of a military force designed to counter it. In order to combat terrorism, the engineer may be involved in a civic action

program designed to reduce the public support of the terrorist group or the construction of barricades to reduce the vulnerability of installations. As a peacekeeper, the engineer's response could range from civic action projects to the construction of the infrastructure that would support a peacekeeping force. Finally, in the area of peacetime contingency operations, the role of the engineer will depend upon the type of response. He can play a key role even in a limited strike operation, such as the Libyan raid, where engineers based in England supported the launch and recovery of the tanker and F-111 forces. If you extend the peacetime contingency to the maximum and discuss a Granada invasion, the engineers also play an integral part in that type of operation.

In essence the engineer's mission can be divided into two categories. One is to insure that facilities required to support a military requirement or preclude the necessity of a military intervention are in place before the "hostility" starts. The other is to provide the required facilities after the "hostility" starts but on or before the date that responding military force needs them. This dividing line obviously becomes very fussy--in fact, no such clear cut division can be made. First and foremost one has to define hostility. Is it a terrorist bomb or a limited war in Southwest Asia? The answer to both questions is yes. In either case the engineer could play a preventive role or a reactive role. In the case of the terrorist bomb, if

preventive measures such as barricades and other security measures had been in-place, perhaps the bombing would not have taken place. After the attack the engineer's role becomes reactive as measures are taken to prevent a recurrence. In the limited war scenario, the engineer plays a preventive role by insuring required facilities, airfields, etc., are available before hostilities begin. If the facilities are not available, the engineer will have to react and make sure required facilities are available before deploying forces arrive.

Further, the engineer's preventive role can be divided into three categories: provide facilities that can support the military, provide facilities that support the people but can be used for possible military operations, and finally, provide facilities that are purely for the civilian population--although almost all "civic projects" have a potential military use.

The engineer's reactive role deals with supporting deploying forces in a wartime or in a peacetime role. The engineer's tasks here are often dictated by how much time is available before the deployment. A long lead time might allow for permanent construction, whereas a short lead time might dictate tents. The time factor, as well as the size of force and the time frame, are key ingredients. In fact, the engineer's reactive response, to large extent, depends upon how well he accomplished the preventive tasks, i.e., a deploying force must either have the required infrastructure

in-place or bring it with them. A Center for Low Intensity Conflict paper, titled "Logistic Support for Low Intensity Conflict--an Air Force Perspective" notes: "Requirements for facilities both during force deployment and for sustainment must be considered. However, LIC can rise suddenly, but the lead time for facilities is lengthy. Therefore, a realistic, timely definition of requirements is essential to successful operations."(8) The study goes on to note that there are three ways to get facilities:(9)

-- improve host nation facilities,

-- build new ones beforehand,

-- bring them with you.

The article concludes that the logistic preparation of the battlefield must identify the host nation facilities that would be available and the maximum use of available infrastructure is key--because it reduces the amount you have to bring with you. Also it notes the creation of facilities can provide a powerful means of combatting insurgency by removing causes of popular dissatisfaction.(10)

The key to being able to respond to the types of conflicts that fall into the low intensity area is to have access to available infrastructure. This is a very important but complex issue. One has to be able to determine where the conflict is going to take place, determine what is needed to support various responses, and

then provide the dollars to make sure the facilities are there if you need them.

A study titled "Staging Base Facilities for Underdeveloped Areas" sponsored by US Central Command, Director of Logistics and Security Assistance, was conducted to determine the minimum amount of permanent facilities that must be built, or made available by a host nation, to meet the requirements of a multifunctional wartime staging base in the Southwest Asia (SWA) area of responsibility. While the study concentrated on the Southwest Asia area, its conclusions highlight the problems associated with providing the facilities needed to support an Air Force presence in an area that has limited, or no existing US presence.

The study begins by noting that few, if any, of the underdeveloped countries which comprise the SWA area of responsibility have the facilities or infrastructure which are vital to successful deployment of a military force. The study looked at the minimum acceptable (i.e., austere level) support required for a: (11)

-- tactical fighter squadron of 24 aircraft
-- B-52 squadron of 24 aircraft and refuelers
-- six E-3A AWACS aircraft
-- army division deployed by C-130, C-141, or C-5
-- a module of base operating support.

The study did not include such basic infrastructure as roads, POL pipelines, electrical distribution, sewage treatment, or water; nor did it consider the type of construction that should be used in a specific area, or how many structures should be built to meet the required square

footage. The study concluded that if certain facilities were constructed in peacetime, all that would be required in case of conflict was HARVEST BARE shelters. However, the following facilities are needed before deployment:(12)

-- 10,000 foot runway;
-- parking apron of 1.96 million square yards;
-- taxiways;
-- arm/dearm pad;
-- compass calibration pad;
-- ordnance holding pad;
-- aircraft washrack;
-- revetments;
-- aircraft fuel truck refueling facility;
-- jet fuel storage;
-- control tower;
-- water treatment/electrical system.

The study pointed out that much of the data available reflected requirements for long term conventional ground warfare in areas where extensive, permanent infrastructure was available--and that this may be an overstatement of requirements. However, it does highlight the tremendous amount of infrastructure that is required to project airpower.

The study paints a very bleak picture, as it should. Similar conclusions can be drawn if you look at the Central/South American region. However, it must be noted that the study concentrated on the upper end of LIC and requirements would be less as the desired/required response moves down the scale of conflict. Therein lies the real problem. As noted earlier, the engineer wants well-defined tasks: what building do you want, where do you want it, what special requirements are needed, and when do you want it? Unfortunately, the range of responses that a LIC may

dictate, as well as the literally hundreds of locations that might call for a response, precludes that type of "concrete" requirement. Equally as unfortunate is that the policy and budget makers will not or can not provide the funds to provide all of the facilities, to satisfy all of the possible demands, at all of the possible locations.

Given that all of the bases cannot be covered and that a response to some type of conflict will be required, the engineer must be prepared to provide facilities to support a deploying force. But once again, basic questions must be answered:

-- where are we going, how many people, how long?

-- what is already there?

-- how much lead time will I have?

Since the key to the engineer's response is what do we have in place, what type of support is required, and how prepared is the engineer to provide it, we need to look at recent contingencies and find out what was needed. What has our experience been in this type of environment? What have recent contingencies taught us? In order to answer these questions, I will look at the Latin and Central America region where the conflicts have ranged from the upper end of the LIC spectrum (Grenada and Falklands) to the lowest end, civic action projects.

CHAPTER IV

CENTRAL AMERICA, THE ENGINEER'S EXPERIENCE

The Region

Of all of the areas that could be studied from the aspect of low intensity conflict the first question must be, why South America? In short, it can be likened to the last frontier. Much time, energy, and writing has been focused on the upper end of the conflict spectrum and our policy/ plan for a potential conflict in the European or NATO environment has been discussed at great length. Further, even though the Middle East is harder to understand, a lot of emphasis has been placed on that region. From the advent of the rapid deployment force to the evolution of Central Command and the construction of facilities in the region, we are fairly well prepared to project power into the Middle East. However, it is my contention that Central and South America have been neglected and our ability to project power into that region is questionable at best.

President Reagan's foreign policy for the region, as stated in the January 1988 National Security Strategy of the United States, is:

> Our own territorial security is inextricably linked with security of our hemispheric neighbors, north and south. We sometimes fail fully to appreciate the great strategic importance of the Latin American and Caribbean regions, in spite of their proximity to our borders and importance to our national security.(1)

From this national objective, the military strategy is developed for the region and executed by U.S. Southern Command headquartered at Quarry Heights, Panama, and U.S. Atlantic Command based at Norfolk, VA. The overall mission of the commands is to provide a stable southern flank for the U.S. The objectives of the commands are to deter aggression against the United States; defend the Panama Canal; maintain U.S. access to regional resources, markets, and lines of communication; and promote regional stability through military-to-military dialogue, security assistance, and maintainence of a presence in the area.

An Air Command and Staff College study entitled "The U.S. Presence in Latin America in the 21st Century" concludes:

> Given the importance of the region and continuing defense interests, it must be considered whether the U.S. military (in particular the Air Force) can support U.S. military objectives in Latin America without a physical presence there. The study concludes that a presence is critical and suggests that, with the potential loss of our facilities in Panama in 1999, alternatives such as reopening Ramsey Air Force Base and establishing permanent forces in Grenada must be considered.(2)

The study goes on to note that Air Force civic action programs are needed as an integral part of this presence:

> While civic action is not a "fly and fight" activity, it can create conditions that will promote stability and lessen the appeal of insurgents in the region. The author suggests tactical airlift aircraft can be used to move construction equipment, materials and people into areas to build roads, bridges and other transportation infrastructures. USAF engineers in Prime BEEF and Red Horse teams can build schools, clinics and other facilities to improve the well-being

> of the people. Medical personnel can conduct medical civic action programs...

The author concludes there are several advantages in these programs for the U.S.:

> First, is the stability they foster by lessening the appeal of Marxist insurgents or the Cubans and Soviets. Second, it creates a favorable image for the U.S., increasing our influence, by having a positive presence. Third, it can lessen resistance to a USAF presence in a country. Fourth, it provides excellent training and increased morale by having USAF personnel involved in tangible worthwhile activities under real, often austere conditions.(3)

I would add a fifth and perhaps overriding benefit in light of my previous discussion, and the author's premise that the USAF must maintain a presence in the area to meet its mission. That is, these programs provide facilities that could be used by U.S. forces if they had to go into the area.

A presentation prepared for the Ninth Air University Airpower symposium titled "The Role of Airpower in Low Intensity Conflict" by Col Calvin Johnson and Capt Peter Sanchez of the U.S. Southern Air Division recommends:

> Dedicate more Air Force resources to civic action/ national development programs and incentives so as to address the human element of low intensity conflict... supply aerial platforms and communications equipment... and expand the AF role in development of a national air transport system country by country.(4)

Given the importance of the region, the military and [illegible] effectively in the area, we return to the question [illegible] conflict and the engineer's role. Once [illegible] responsibilities fall into two familiar [illegible]:

Preventive: provide infractructure, both civic and military, to meet possible conflict requirements.

Reactive: support deployments into the area if required.

What has our experience been? Are the facilities needed to support contingency requirements availble? If not, can they be provided?

Grenada

The Grenada invasion was a very unique, special case and while I hesitate to draw sweeping conclusions from an isolated case, it does raise some interesting issues that the military may face in other contingencies.

Grenada was truly a limited contingency operation. The invasion consisted of a small force, with limited objectives, and it lasted just a short time. Those factors are important. Equally as important is the fact that there was insufficient infrastructure to support the military objectives. As noted earlier the availability of that infrastructure is key.

The airfield at Pearls was only 5300 feet long, in the mountains, and not suited for C-141s. However, the airfield at Point Salines, which was under construction, was 9000 feet long, 150 feet wide and capable of handling aircraft up to 747s. While it did not have navigational or surveillance radar, a parallel taxiway, or dispersed

parking, it was suitable for some operations. It should be noted the airfield at Barbados had to be used as a forward operating base. Several other operational concerns must be addressed. First, the lack of ramp space severely limited the effort to off-load troops and equipment. The 141's had to unload on the runway and only one plane could be on the ground at a time. Second, Grenada was far enough from Cuba that their tactical aircraft were not a concern. Those two key factors should weigh heavily on any plan that is developed to project airpower into this region. From an engineering perspective, the operation did include the deployment of Army engineers. The engineer's major role was played after the initial operation and consisted of:

> First priority was to insure the airfield was operational and to remove obstacles/rubble from the runway. They performed this mission by utilizing the construction equipment on site--Russian dump trucks and bulldozers. The emphasis was placed on this task and rightly so. The obvious question that needs to be asked is: "What would have happened if the airfield had been cratered by the Cubans prior to the invasion?"
>
> Following the initial invasion and securing the area, the engineers erected security barriers, provided construction support to confine the 600-prisoners that were taken, constructed helipads, and erected radio antennas.

> Finally, they repaired electrical distribution lines, repaired roads, provided water production, and were concerned with such tasks as providing sanitary facilities and landfills. (5)

In essence, even in this limited operation, the engineers performed the tasks that they had been trained to perform in the larger war.

It should be noted that the largest and probably most longlasting tasks that were completed were in the area of "civic" action. The engineers played a major role in repairing existing roads, and repairing, and then teaching locals how to use the generators that were on the island but had been allowed to deteriorate.

Two interesting notes that will be returned to later are:

> First: Knowledge of the area was limited and even before the invasion the engineers had to resort to Chamber of Commerce maps to get the layout of the area.
>
> Second: During the civic action program, emphasis was placed on the use of local contractors who were found by using the phonebook and ringing door bells. The intent was to use local skills and labor. They repaired the asphalt plant and rock crusher and trained people to use them.

The Falkland Islands

The British "limited war" on the Falkland Islands has many interesting parallels to our experience in Grenada. It too consisted of a relatively small force, lasted a short time, and there was no real intent to keep a large task force in place.

Notwithstanding the logistic problems associated with projecting power 8000 miles from home, one of the biggest problems facing the British was the lack of an airfield. There was no Port Salinas and even after the Port Stanley airfield was secured they still had to use a forward supply base concept of the Ascension Islands and South Georgia Island to shuttle men and equipment. The problems the British had are once again worthy of study for the planners who are contemplating military operations in an area with limited airfields and limited prepositioned material--it is not the same as a return to Europe or even a rapid deployment exercise to Southwest Asia.

From an engineering perspective the British engineers (sappers) experienced many of the same problems we faced in Grenada. First they experienced numerous planning problems because they really did not know what their tasks were going to be. This was especially difficult since they were going to sail 8000 miles from home and had limited shipping space. They were not sure what they were going to

do when they got there but given the time they had to prepare (notified on a Friday, sailed the next Monday) it probably did not matter. Fortunately, they knew what they thought they would need (tents, force beddown material, airfield matting).

They discovered that they also had a lack of knowledge of the area but fortunately engineering construction teams had been on the Falklands during the previous summer. Terrain information was produced, printed overnight, and 5000 copies were flown to the Ascension Islands to be helicoptered aboard task force ships as they steamed south.

The engineers' major mission was to provide a forward operating base on land as soon as possible, to:

> Repair the existing runway and extend the airfield for fighter aircraft. This task took two weeks using airfield aluminum matting from the U.S. The amount of time to do the work should not be passed over lightly.
>
> Repair and extend existing utilities. Water, sewage, and electrical systems had been virtually knocked out all over the island.
>
> Finally, provide temporary vertical construction to house people as the town's population doubled. (6)

Two major issues that will be addressed later:

First, the sinking of the Atlantic Conveyer had a major impact on the engineers. Over 4000 tents were lost as well as the aluminum matting for the airfield. Fortunately, the original plan called for a big base and stores already on shore were enough to provide a medium size strip.

Second, equipment issues played a major part in the engineers's mission. For example, among the casualties of the Argentine occupation had been the island's only stone crusher--its belts had been cut by the Argentinians to make shelters. Fortunately, many weeks earlier, a stone crusher had been included in the engineering equipment competing for space with ammunition and spare parts on board vessels heading for the Falklands. Without it the airfield extension would have been impossible.(7) One wonders what would have happened if it were on the Atlantic Conveyor.

Exercises

Other than the two limited wars experienced in this region, the remaining experience consists of exercises conducted by various units of the Army, Air Force, and Army and Air Force Guard and Reserve. From an engineering perspective, the Air Force's active duty participation has been very limited. While Red Horse has been involved in several of the exercises, not one active duty Prime BEEF

team has participated. These exercises have provided a number of benefits:

They have provided a means of constructing some of the infrastructure we would need to project a military force; i.e., assault strips and ammunition areas.

They have given our engineers an opportunity to train with host country engineers and learn skills that are appropriate for the region and are consistent with local material.

They have given our engineers an opportunity to learn about the area and to become accustomed to the region, from the weather to the green wood.

They have also provided facilities that are "cheaper" because transportation and labor costs are not part of the project cost. While this may sound academic (the money is coming from somewhere) it is not. If you are trying to build to meet the requirements, with congressionally mandated cost constraints, the impact is significant.

Finally, the projects benefit the host government and provide the benefits derived from a civic action program.

One of the major exercises conducted in the region goes under the title of BLAZING TRAILS and is an integral

part of the U.S. policy to promote stability in Central and South America. The exercise's major objective is to extend and improve roads in the region and train Reserve and National Guard engineers. Major Brink, US Army Corps of Engineers, noted in an article entitled, "Latin America: Where the Action is," that:

> Latin America is a great training area. Rarely in peacetime do engineers have the opportunity to plan realistically in such detail. The Army uses these training exercises to test evolving doctrine on the uses of soldiers and engineers in low intensity conflicts.(8)

The BLAZING TRAILS project started in 1985 with work on a two lane, dirt, farm to market road in Honduras. Different sections of the road were worked on by various Guard and Reserve units during their active duty time. Members from the Missouri Army Guard, the West Virginia Army Guard, and numerous other units participated in the exercise. During one period (from Jan - May 86), over 5000 Army National Guard engineers and 150 Honduran Army Engineers worked on one section of road. The benefits were many for the local area. The road opened up remote areas for economic growth and development, improved living conditions, and allowed families to reach better medical facilities and schools. For the Army, the effort provided an excellent training opportunity since rugged mountains posed both construction and living in the field challenges.

As the engineers combatted high temperatures, steep inclines, heavy rains, and a highland swamp, one engineer noted:

> A swamp on the side of a mountain defies anything we've ever seen or read about. The muck came up to the belly pin of the dozer [four feet above the bottom of the blade]. We had to use a crane to get it out.(9)

As the engineers learned to live in the area, they found water was and is a premium in Honduras--purified water is gold. One of the water specialists noted:

> This is the first time I've ever seen one of these [water purification units]. At Fort Lee, I went through the academic portion and we pretended to operated one...but until I got here I never did. There are a lot of guys in the active military that have never operated one. (10)

Task Force 1169 was tasked to help repair roads after an earthquake in Ecuador. Because of the location of the project and the conditions after the earthquake, air support could only reach a small airfield 45 minutes south of the site--as the crow flies. The equipment had to be convoyed to the site and it took them three and one-half days over the Andes, a 57-mile trip. The travel time is a key point. The site was so remote that there were very limited sanitary facilities, no potable water, and no means to replenish forgotten necessities. One of the units' first priorities was to construct a base camp and develop a makeshift airfield to accommmodate UH-60A Blackhawk helicopters.

The conditions were such that the engineers described them as:

> Rain, mud, and conditions taxed equipment and engineering skills beyond anything we ever encountered in the States...the soldiers compared the mud to ...chocolate pudding, quicksand, and a bottomless pit. (11)

One of the water experts noted:

> Back in the States, you just go through the motions. Here, if the water isn't clean, people get sick. (12)

The training they received was excellent. The engineers learned that Army field manuals that suggest, for example, to clear a swath along the roadsides as was the practice in Vietnam, are dead wrong for the soil conditions of the region. In this South American nation, road builders use "palizada," a base course of logs packed tightly across the roadway. We call it corduroy, though we have not used it much since World War II.

The engineers also found that much of the heavy equipment in the inventory was too heavy for the conditions. Dozers and backhoes can easily sink hip deep in the mud and concrete construction is a near impossible challenge. Steel wire baskets packed with rocks are built up to work like concrete. These baskets are filled by hand--a very time-consuming job but it is the only way to do it. They also found that the workhorse at the bridge site was a 75-ton rock crushing plant which was kept busy all summer. It was older than most of the soldiers using it and was designed to handle relatively soft limestone. Because of its age, there was a constant question of whether it would break down or not. Other exercises experienced similar challenges. During CABANAS 86 engineers were tasked to: (13)

-- construct base camps for forward troop support;

-- repair, extend,and maintain an airfield at Puerto Lempira;

-- construct parking aprons, some vertical construction (concrete block buildings); and,

-- perform civic action projects.

They were also tasked to construct an airfield in the vicinity of Mocoron, Honduras to handle in excess of 100 aircraft sorties. The location was a C130 capable airstrip at Puerto Lempira approximately 47 miles, by dirt road, from Mocoron. During the deployment (from 25 February to 8 March) the task force used 18 C141B sorties and five C5 sorties from Pope Air Force Base to Palmerola and nine C130 sorties from Pope to Puerto Lempira. Intertheater air consisted of over 50 C130 sorties.

Several important points should be emphasized: (14)

The mission of the engineering battalion is to construct a medium lift airfield within 72 hours of insertion of an airfield construction package at a low level of difficulty (minimal clearing, relatively flat ground, and suitable soil condition). It took nearly 16 days (including weather days) to construct an operational field at Mocoron.

Parts and equipment problems surfaced. Parts obtained from the States took 14-21 days to arrive. Parts obtained from within the joint task force system

averaged 10 days (went from 2-21 days). Local purchase parts took 4-21 days and depended on where the part was in the system (in country or in Miami).

Air and fuel filters on equipment had to be changed every other day.

During other BLAZING TRAILS exercises, specifically AHUAS TARA 87 and 88, additional training in airfield and base camp construction was obtained. Teams found that soil stabilization was a real problem and they ended up loading cement on a scraper and spreading it in 60 by 300 foot strips.(15) They used two and one half million pounds of cement, mixed it up with rototillers, wet it down with water distributors and compacted it. The technical report attached to the exercise after action report is must reading for any engineer tasked with designing pavement projects in the region.

The engineers also found that it was important to establish local accounts for parts and equipment.(16) The average customer wait time on non-stocked, locally purchased parts was five to seven days. By comparison, the order to ship time for parts obtained through normal channels was approximately 28 days. They also found that local rebuild was available for generators, alternators, brake shoes, tires, etc. This capability was critical but it also highlights the need for Spanish-speaking representatives to help with contracting.

From the Air Force perspective, active duty Red Horse units and Air National Guard units have had experience in Central America. Members of 172nd CES, Mississippi Air Guard, have deployed to Palmerola AB, Honduras and according to their commander, Maj Paul J. Barlow, received the best hands-on training they have ever had.(17) They constructed a 44 by 32 foot passenger terminal and a 10 by 10 sterilization room for the medical clinic with air conditioning. Members of the 113th CES, District of Columbia Air National Guard, during FUERTES CAMINO 88 built two buildings at Palmerola, one to serve the U.S. supply activity and one to serve 500 school children. Major concerns were the weather and local construction practices. Even the troops from Mississippi, who were accustomed to hot and humid weather, found that Mississippi was nothing compared to Honduras. The team from Washington D.C. ended up working 15-20 minute shifts because of the 100 degree plus temperatures. One of the most interesting comments came from professional carpenters who found working with the native materials interesting at best: "There is nothing like hammering a piece of green wood and having water spurt out into your face."(18)

Although all accounts noted that valuable training was being received and that they were learning how to operate in a bare base environment, the numbers being trained were still small. The Mississippi deployment consisted of 44 people.

Active duty Air Force Civil Engineering experience in the area has fallen on the shoulders of the 820th Civil Engineering Squadron, Red Horse, Nellis AFB. Their most recent involvement was in AHUAS TARA 88. They deployed for 90 days (29 Jan 88) with a team of approximately 250 people and deployed nearly all of their organic equipment, a task that had not been undertaken since the Vietnam War.(19) They were responsible for the construction of a military project at La Mea AB. This project consisted of a 3500 square meter cargo marshalling area, composed of soil cement stabilized material, select fill, and a crushed gravel wearing surface. A 160-foot deep fresh water well was drilled to supply construction water. A 0.3 mile long access road was constructed to avoid equipment traffic through the international airport parking lot. The operations branch was also tasked to build the tent city and associated facilities to beddown the 220-man force for the 90-day exercise. The military related construction had a funded cost of just over $760,000. Two civic action projects were accomplished during the deployment. The largest was a five building, 7,200 square foot complex to be used for handicapped children. It was block wall construction with wood trusses and corrugated metal roofing. The facility contained restrooms, classrooms, and offices. The other civic action project was a 1,600 square foot addition to an existing elementary school located in the town of La Lima. It was the same type constuction as the

large school and had a classroom, an office and two restrooms. The civic action funded cost was $97,000.

The scope of the project is significant and the important factor is the amount of work required to accomplish these relatively small tasks--in relation to what it takes to provide facilities for force projection, i.e., provide airfields. A quarry was developed two miles away to provide the select fill needed for the cargo marshalling area and access road. Over a 60-day period 9250 dump truck loads were needed to haul 130,000 tons of material. During a 45-day period the hauling was going 24-hours a day.

Two of the more significant facets of this deployment were the effort it took to project this force and the effort required to sustain it, both factors that would have to be taken into account for similar contingencies. Over 3.5 million pounds of construction equipment and cargo had to be moved from Nellis AFB to the port at Beaumont, TX; the movement required 107 commercial truck loads. Over 100 tons of personnel support equipment and 210 personnel were airlifted by six C-141B aircraft from Nellis AFB to Palmerola AB. It is important to note that the transient time between Texas and Honduras was five days and it took another 12 days to move the equipment from the port to the construction sites.(20)

The Combat Supply System (CSS) was deployed with the unit and the war readiness spares kit (WRSK) was the key to the deployment's success. Over 28,170 parts were deployed.

Three out of every four demands for vehicle maintenance support were satisfied with on hand parts. Resupply during the exercise consisted of nine weekly C-130 flights from Nellis AFB to Palmerola.

The exercise provided valuable training in:

-- living in the field;

-- equipment training, something operators never get enough of;

-- enlightening the contracting office on scope of support needed for construction project in foreign country.

Further, the contracting officer after action report noted:

> Upon arrival to Honduras the representative from the Accounting and Finance office should be one of the first to deploy (with proper funds and obligation authority). Funds from out of pocket were spent to obtain potable water and supplies which were essential in maintaining proper health standards.(21)

The importance of the training in this region cannot be overemphasized. Engineers had to remove snakes, ranging from one foot long coral snakes to eight foot boa constrictors, from their living quarters on a nightly basis and scorpions and tarantulas crawl up and into everything. (22) Home station training just does not have the same impact!

CHAPTER V

LESSONS LEARNED

What can we glean from our experiences in Central America? Are the lessons different at the various levels of conflict? Did the engineer do things differently in Grenada than he did during a civic action project in Honduras? I suggest that the lessons are the same.

However, before I review the lessons learned, I need to address the question of team structure--should we organize in peace as we expect to go to war? The decision to restructure Prime BEEF was driven by the desire to tie the teams to the wing that they support in peacetime and deploy with in wartime. Unfortunately, this creates a serious problem in the Southern Command because of the limited number of in-place forces and few, if any, deploying forces dedicated to the region. One of the major shortcomings seen in the Falklands, Grenada, and during exercises was the lack of knowledge of the area, construction practices, and requirements. None of the active duty Prime BEEF teams have participated in the exercises conducted in Central America and even Red Horse's experience in the area has been limited. Only about 200-250 active duty Air Force civil engineers have been exposed to what every team that has been in the area called a valuable training experience.

It is not uncommon for engineers arriving in a European environment to be perplexed by the different utility systems, voltages, equipment, and construction requirements. The shock of going into a Central American region is even greater. The lack of training in the region is a problem, especially when you consider the joint environment. One of the major lessons learned (and benefits derived) from the Red Horse deployment was the realization that the Army engineers and the Air Force engineers do things differently. More joint exercises are needed. Further, the need to increase the level of participation and the importance of wide distribution of lessons learned can not be overemphasized. To be truly effective in this region more people must become familiar with the region, the tasks, and the constraints.

The remainder of this chapter will discuss each of the "campaigns" separately and then categorize the lessons learned into the major headings of planning, team structure and training, equipment and logistics, and construction practices.

The Falkland Islands

The British engineers' experience during the Falkland campaign is a good predictor of what engineers may face in Central America. First the British found themselves with little advanced warning of where they were going or what their mission was going to be. The lack of contingency

plans, the lack of information about the island, and the lack of requirement definition were the major initial stumbling blocks. The engineers found that their greatest asset was their versatility.(1) The right equipment was not always there and redesign, improvision, and ingenuity were essential requirements. Although they were able to take equipment with them (the benefits of a sea launched campaign), the sinking of the Atlantic Conveyor and the loss of 4000 tents and the aluminum matting that was programmed for the airfield extension was a major setback. This loss forced them to rely on local sources and modify their plans to extend the runway. A major issue that we will see again, was the need for select fill and the importance of a stone crushing capability. The invasion force commander noted that the airfield extension would have never taken place without it.(2) This factor becomes very significant and almost scary, when you consider that several weeks earlier the space required to ship this piece of equipment was also scheduled for ammunition. Good luck or good planning? In addition to equipment concerns, it should be noted that the airfield extension took more than two weeks, a significant planning factor for those considering airfield requirements for various scenarios. Two other lessons must be taken from this experience. First was the importance of physical fitness as the engineers, along with the rest of the forces, had to march 70 miles to meet the objective and having no sooner arrived they immediately started clearing the

airfield and repairing utility systems. Finally, although Air Force engineers are not responsible for explosive ordinance disposal, mines and unexploded ordinance were a major limiting factor. This problem demands our attention.

Grenada

The U.S. Army's experience in Grenada reemphasizes many of the lessons learned by the British. First and foremost, the requirements were ambiguous and ill-defined. Initial information about the island and its infrastructure was sketchy and the engineers turned to Chamber of Commerce maps. The deploying forces were given very little time to prepare and the value of readiness exercises really paid off. Ingenuity and initiative became the watchwords. Unlike the Falkland campaign where ships could deliver equipment and material, the deploying engineers on Grenada had to utilize in place equipment and material. They found that their immediate need was equipment operators--ones who could operated foreign-made equipment and knew how to "hotwire" Russian-made dozers. As the British learned, the majority of the engineer's work took place after the objective was achieved and once again utility systems had to be repaired, generators fixed, and some vertical base camp construction was required. This campaign highlights a significant fact. As bomb damage (war) repairs were being made, the engineers also found themselves completing civic action projects as the two tasks quickly began to merge, a

fact that should not be lost in a low intensity conflict as the political, military, and peacekeeping actions all begin to mesh together. Further, local contractors provided much of the labor and materials needed to complete the engineers' tasks. The need for contracting personnel and language experts becomes obvious as phone books were used to contact local contractors--something you do not expect in a "war" environment.(3)

The effects of a limited airfield were also felt as the lack of parking aprons and arresting barriers had to be considered. Fortunately, thanks to ongoing construction, the airfield pavements were long enough to support the required aircraft. However, airfield availability was obviously a limiting factor, as it was in the Falklands. Finally, two recurring themes appeared. First, one of the first priorities was to repair the island's rock crushing machine, and second, the issue of physical fitness raised its head once again.

Exercises

Before discussing specific exercises, several general comments are in order. First, prior to the start of any exercise the importance of prior planning and site surveys needs to be stressed over and over again. The need to know the area, the need to establish contacts with host country representatives--before, during, and after the rainy season, and the need to find out what material and equipment

were going to be used were all keys to a successful exercise. Each exercise experienced difficulties with the heat, the lack of proper sanitation systems, the lack of potable water and the shortage of equipment, material, and repair parts. While one could argue that site surveys before a contingency operation are not feasible, I would argue that experience gained from exercises, from good contingency plans, and from previous operations must take the place of the "pre-contingency" site survey. Major Brink notes one should never accept a project sight unseen or without construction materials on hand.(4) He highlights that equipment must be in top condition before the deployment because parts are difficult to come by in Latin America and he concludes you should be conservative in your estimates. I submit we should not take on a contingency operation without taking the same factors into consideration. Col Sefton, task force commander, concludes:

> The Army [and I submit the Air Force] needs to get all this expertise we are relearning and finding out here and get it all together in one place--make it a resource we can use whenever we have to get into these situations. The right kinds of equipment, the hand construction methods you need in remote areas, the knowledge of how to handle this type of terrain.(5)

Task Force 1169 and AHUAS TARA 87

Many of the lessons learned during the construction in Ecuador dealt with equipment problems and construction techniques.

> It has been observed that the Ecuadoran Army is having much success using CAT D-6 dozers in the soft soil instead of the much larger and heavier D-7s.

> Their success is attributed to operator experience in soft soil conditions and the fact that smaller dozers transmit lesser ground pressure.(6)

In this situation, the Army found that much of the heavy equipment in the engineers' table of allowances is just too heavy for the conditions. The equipment easily sank hip deep in the slick mud. Two types of equipment needed in the inventory are the D6 swamp dozer and the hydraulic tracked backhoe. This type of equipment has wider tracks, is lighter, and can stay up and maneuver better in the mud. The Army operators also learned some valuable lessons from the local operators--true justification for additional exercises. Local construction practices were key as the operators found that if they graded shallow cuts and avoided filling the dozer blade to the point where the tracks slipped, they were much more successful. The conclusion that was reached by task force leader was:

> Dozer operators should train in soft loose soil to learn the necessary techniques needed for working in this type of environment.(7)

The task force also found that local construction techniques were superior to our highly equipment oriented techniques. Cement was manhanded into scrapers and although over two and one half million pounds was hand-loaded, task time was cut by 75 percent.

The engineers also had many problems with obtaining sufficient material support. Local contractors were unable to deliver sufficient crushed rock and the rock crusher became the piece of equipment that determined the critical

path. This experience taught them that the industrial capacity of developing countries may not be able to support even moderate construction efforts. The team also developed a healthy respect for the climate as they had to fill the base camp area with over 6000 five-ton dump truck loads of rock, just to develop a firm footing to build on.

As could be predicted, the major lesson learned was the importance of training where you may be fighting. LTC Cajigal, commander of the 27th Engineering Battalion concluded:

> We deployed, secured, and sustained ourselves in a foreign environment; we had to perform tasks similar to our wartime tasking--there's no better training.(8)

AHUAS-TARA 88

The after action reports provided a wealth of information concerning lessons learned. The lessons were broken down into areas of procedures, equipment, supplies, and technical issues.

Once again the importance of developing a knowledge of the area was stressed. They found if the design teams were familiar with local conditions, fewer design changes and a much smoother program could be developed. They also stressed the importance of having the design team deploy with the construction crews. The Army engineers discovered the advantage a Red Horse squadron has since its design and construction teams come from the same unit.

Some of the most valuable lessons were derived from problems experienced with material deliveries and equipment capabilities.(9) The engineers found that they had to rent equipment because the magnitude of the work easily went beyond the capabilities of the unit's organic construction equipment. In addition, not all of the supplies needed were available; for example, shortages of plywood delayed the completion of numerous projects. The key to the solution of these problems was to have local contracting authority and the key to that effort was to have a Spanish linguist to talk to Honduran engineers, contractors, and suppliers.

The importance of this capability can not be over-emphasized. This author found that during the initial beddown of the Ground Launched Cruise Missile (GLCM) at Comiso AS Sicily, the ability to speak to local suppliers/ contractors was a key to success. We had an NCO who spoke fluent Italian and he made arrangements for the delivery of water, spare parts, and translated the operating instructions for some of the locally procured equipment. His abilities saved us hundreds of hours.

From a construction point of view, one of the most valuable lessons learned dealt with the availability of water--a rather ironic situation when too much rain water made conditions during the rainy season unbearable and not enough construction and drinking water caused equally as many problems during the dry season. Over 40,000 gallons of construction water was needed each day. The one deployed

water distributor was not adequate. The unit had to be augmented with three 6000-gallon distributors and a trailer to do the flightline job alone. Another unit had to be dedicated to camp dust control and during one nine day period over 61,000 gallons of water were used. During the first few days of deployment, potable water was contracted for but had been super-chlorinated above 10 parts per million and was not safe to drink. During this period, because of the shortage of water blivets, the resupply of water was dependent upon five 250-gallon blivets sling-loaded by helicopter from Palmerola.

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The problems during this deployment mirrored the ones discussed earlier. The importance of local purchase was emphasized over and over again. Repair parts for the construction equipment were obtained from local sources. However, it is important to note that if the part was not available in stock, it normally had to be back ordered from a supplier in the States. None-the-less, that delay was less than using the military supply system. Local construction material was used (lumber, building blocks, and plumbing supplies) because the engineers quickly found that flying in plywood was extremely expensive and time-consuming.

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The experiences and lessons learned by the 820th Red Horse Squadron's deployment to Honduras provides an ideal capstone to this section.(10)

Having learned from previous experiences, the team deployed the contracting and finance officers with the advance team to insure essential resources were available before mass troop arrival. Water and ice had to be purchased locally for the first two days before equipment was set up. One hundred and five degree temperatures and 90 percent humidity drove a requirement for hundreds of gallons of potable water within hours of bivouac. The single most important project support function was contracting. Over 335 individual contracts were cut. Several pieces of equipment were rented in order to accomplish projects, and rental equipment was absolutely essential to horizontal construction. Equipment such as a sheepsfoot roller with blade, 5,000 gallon water distributor, and vibratory roller were rented for the duration of the deployment. During a portion of the exercise, dust created so many problems with air filters on tracked loaders and dozers that after exhausting war readiness supplies, the contracting officer had to purchase bulk quantities.

Construction problems revolved around soil conditions and material deliveries. The cargo marshalling yard design had to be changed because of subbase problems. After excavation, the engineers discovered that the subbase

consisted of expansive clay that was very unstable and unacceptable. Over 4000 truckloads of material had to be taken out and replaced with select fill. The original design called for 6 inches of soil cement, 24 inches of select fill, and 6 inches of crushed stone. (36 inches total). The design had to be changed to 48-60 inches of fill, 6 inches of soil cement, 6 inches of select fill, and 6 inches of stone (upwards to 75 inches of material). One of the major problems evolved around the ability to provide crushed rock. The squadron's rock crusher was damaged enroute to Honduras and could not be repaired in country. Relying on local contractors caused delay and available material drove a change in design specification.

Continuity Over Time

Before leaving the discussion of lessons learned, I would like to step out of the theater and turn to a deployment to Cairo, Egypt, in 1980, by the 823rd Red Horse Squadron in support of CORONET LINK/PROUD PHANTOM.(11) Much can be said about the similarities between this deployment in Southwest Asia, and the exercises in Central America--thousands of miles and six to eight years apart.

The PROUD PHANTOM deployment consisted of setting up a HARVEST BARE village to support a fighter deployment. The first members of the Red Horse Squadron and the HARVEST BARE (4449 MOBSS) team arrived on 18 June. The first team members redeployed on 8 July as they prepared to turn the

site over to the Prime BEEF teams that would maintain/ operate the site. It took over 20 days and 10 C-5B loads to set up the camp. Twenty days; that is a very important fact for the planner who is planning contingency responses to consider. It is important to note that an airfield to support fighter operations was already available and the construction tasks consisted of:

-- construction of the HARVEST BARE village to include providing utilities (water, sewage, power);
-- construction and repair of airfield pavements for parking aprons, loading ramps.
-- road repairs/stabilization, to include a unique approach of mixing cement with a rototiller--a technique that was rediscovered six years later in Central America and heralded as a unique new solution.

The keys to the success of this deployment were:

The need for a predeployment site survey. Although the predeployment teams had a lot of problems identifying requirements, coordinating airlift requests, obtaining accurate utility drawings, and other advanced information, the fact that members of the team had seen the site and had talked to host base engineers before the equipment and material lists had to be finalized prevented many problems.

The condition of in-place utility systems was a real problem. In-place generators were in poor condition, sanitary facilities were poor to nonexistent and there was insufficient water available to meet task force requirements. The engineers had to plan to provide all of the utility support needed during the entire deployment.

The ability to procure items locally was extremely important, as was the translator who made talking to local contractors, suppliers, and host base engineers possible.

One final thought before summarizing the lessons learned from an engineer's perspective. In a study of base development in a low intensity conflict environment, Col Arnold Schlossberg, Jr., a Joint Task Force commander in Honduras, made these points in an after action letter describing logistic considerations in a bare base environment. Col Schlossberg concludes:

> Commanders need to be convinced that the first group they want on the ground are their support people--the contracting officer should have a language capability and a bag full of money. A site survey is critical--what the local economy has to offer in terms of food, water, facilities, power, warehouses, etc., are keys to success. You've got to know what the transportation system will support. His final thoughts dwell on innovation ... Planners tend to tell you that you have a near impossible situation on your hands. Operators tend to go in and make it happen. (12)

Some may argue that presite surveys are not possible in a contingency environment and hostilities are not going to

allow the contracting officer to run around and buy local supplies. I believe the first conclusion may be true, to some extent, and the second conclusion is false. Therefore, the lack of a presite survey makes planning and exercises very important. However, I believe the use of local material and supplies will be available in all but conflicts at the highest end of the conflict spectrum--something that we probably will not see in Central America.

In short, the lessons learned from engineering experiences from the Falklands and Grenada, to exercises in Central America fall into the following categories:

First, the availability of in-place infrastructure (particularly airfield pavements) is critical.

Second, expect poor, insufficient utility systems. Power supplies, and water will be some of your first problems.

Third, the deployment of and setting up of facilities to support even small forces (less than 1000 people) takes a lot of airlift and a lot of time. Planners need to rely on what is available.

Fourth, expect logistic problems. Be prepared to rent or "procure" local equipment and material. Having someone who can speak the language is critical.

Fifth, time for advanced planning may not be available. Therefore, exercises in and good plans for areas that might see low intensity conflicts are key.

With this background, what do we do to prepare for responding to low intensity conflicts?

CHAPTER VI

PREPARING FOR LOW INTENSITY CONFLICTS IN CENTRAL AMERICA

As one reviews the engineer's experience in Latin America and then tries to suggest future courses of action, you have to step back and ask what are the nation's objectives? Then and only then can you determine whether the engineers are capable of performing the mission, and suggest ways to improve their performance.

If one accepts the premise that Central America is important to our national interest,

> ...Our own territorial security is inextricably linked with the security of our hemispheric neighbors..., (1)

you have to ask what role should the military (in our case the Air Force) play in accomplishing that objective? Many will argue that the military should not get involved in other peoples' wars and compare what is going on in the region to another Vietnam. On the other hand, others will argue that the military not only has a role to play in the region, but should in fact increase its physical presence. The ACSC paper argues that permanent bases must be established in the region in order to meet contingency requirements.(2) The basis of this argument keys on the importance of the region, the experiences in Grenada and in

the Falklands (i.e., the problems of power projection without forward airfields), and a belief in the likelihood of future conflicts in the region. We must maintain a military presence in the Caribbean to deter potential aggressors, to demonstrate our regional interest and to take advantage of the training environment.(3)

That argument, any argument, must address the basic question: What type of threat do we perceive in the region? While no one would suggest that we will become involved in another WWII, most will accept that other types of conflict in the region are likely. We soon get into the whole issue of low intensity conflict and how to combat it. As noted in Chapter 2, the probability of low intensity conflict is great and the first order of business must be to look at LIC and determine how to combat it:

> LIC defies purely military solutions. It requires a cross discipline approach which recognizes the interplay of social, economic, political and military factors.
>
> If socio-economic conditions in a particular country improve, then insurgent groups will find it extremely difficult to win the hearts and minds of the people. (4)

Therefore, the best way to combat a LIC is to prevent or eliminate the conditions that lead to it. Major emphasis must be placed on civic action and the military can and should play a major part in that effort.

In an article entitled, "Engineers Build Stability in Troubled Regions," Col John Schaufelberger states:

> The goal must be to reduce the number of insurgents by eliminating their popular support. Social, political, and economic initiatives are often more

important than military ones and early actions must focus on nation building and nation building is a prime role for engineers. Engineers can provide support by:

--designing projects to be built by host nation or U.S. military engineers
--designing projects constructed by local labor force
--providing advisors to help local agencies complete projects
--establishing training programs for locals...this is key because the real goal of civic action must be to develop in country expertise. (5)

A study conducted at the National War College entitled "Military Civic Actions and USAF Bases in the Third World" advocates revision of the USAF policy on military civic actions based on insights gained from Thirteenth Air Force's program at Clark Air Base in the Republic of the Philippines.(6) The thesis of this paper concludes that such programs, although designed to minimize difficulties associated with the presence of Air Force facilities in the Philippines, should be adopted in countries such as Korea and Turkey. I believe the recommendations can be applied to any third world country. In an equally compelling report prepared at the Air War College, entitled, "US Civic Action: A Pragmatic and Potential Decisive Foreign Aid Option for Developing Nations in the Pacific Basin," advocates the expanded use of U.S. civic action as an inexpensive, pragmatic, and potentially decisive foreign assistance option for countering Soviet expansion. Although the paper deals with the Pacific, its conclusions can be applied to Central America. In fact, an argument can be made that the conclusions are even more relevant because of the close

proximity of the region. The author cites numerous studies that show:

> These projects are absolutely essential in bonding a community, the military, and therefore the government together in a way which collectively inhibits the possibility for insurgent movements. The deployment of non-combat support units for civic action duty fully supports nation building which has a direct impact in opposing Soviet influence...in addition it is an outstanding training opportunity and tests various aspects of military readiness. It further provides a realistic mechanism to test both deployment and sustainment support systems in remote and unfamiliar locations. It allows both individuals and units an opportunity to gain insight and develop confidence.(7)

The study goes on to state:

> Military civic action has similar goals and objectives and can be viewed as the Peace Corps in uniform...it is in the best interests of our nation to seriously develop a long term approach. The proponent of this combined effort should be the Department of State who can best interface with the government of the host nation. (8)

The study concludes:

> Funding could be the only real drawback; however, the author believes this can be overcome if supported by our senior civilian and military leaders. (9)

While I agree with his statement, it is not that easy and the funding issue will be discussed in more detail later.

Given that conflicts can not always be prevented, we need to look at various responses. Again, there is a whole range of possibilities--many of which do not include the military. Others, such as the Libyan raid, are very limited and require little support. However, as you move up the scale of responses and get to Grenada/Falkland Island campaigns, the importance of existing infrastructure becomes obvious. Therefore, one of the keys to being prepared for a

LIC is the availability of infrastructure. This type of infrastructure is being provided in Southwest Asia, especially in Oman and Moracco and should be provided in Central America. The importance of in-place facilities has been proven over and over again and we've found that trying to provide them after hostilities start is extremely difficult. Exercises have shown that bringing these facilities with you is costly and time consuming. Just one example of that difficulty, even in an exercise environment, is highlighted in the CABANAS 86 after action report. The report states:

> In addition to the tremendous amount of personnel and time required to prepare contingency air delivery equipment to a usable configuration, a tremendous amount of support equipment was required for the heavy drop deployment. Twenty-two of the heavy loads could not be stored on rollers due to weight and therefore 22 flatbed trailers were needed to store loads and transport loads. One tractor was needed to move trailers during rigging operations. Three tractors were needed during load out to move the loads from the heavy drop rig site to the departure airfield. At the departure airfield, the Air Force used as many as six 40K loaders to temporarily store loads and to subsequently load the aircraft. The heavier loads were placed on the K-loaders by a 40 ton crane provided by the Arrival/Departure Airfield Control Group at Green Ramp. Troops were transported by a combination of 80 passenger troop transports, 45 passenger buses, and tactical vehicles provided by the support unit. Although this equipment was requested several weeks out, it was somewhat of a fight to get it due to day to day support commitments by support units on post. This leads to some concern about the availability of such support during an actual emergency type deployment. Support requirements for emergency deployments Corps wide must be reviewed and studied; and scarce support resources must be taken into account in deployment plans.(10)

I would go further and recommend that we should not attempt to bring the support with us--it should be provided before hand.

Thus, we have two options: one, as suggested by the ACSC study, is to provide permanent bases, such as reopening Ramsey AB. The other option and the one that is probably more politically acceptable is to provide base infrastructure as we are doing in SWA. If we fail to have the infrastructure in place and have to deploy, the lessons of Grenada, the Falklands and the numerous exercises must be considered. We need to be familiar with the area; we need to know what infrastructure is there; we need to realize that utility systems will no doubt be in poor condition; and we need to have seen the area. Since all of that can not take place on short notice, resources to conduct exercises in the region, ideally in the country where a LIC could start up, must be provided.

Therefore, the best way, perhaps the only way to fight a low intensity conflict is:

> First, prevent or eliminate the conditions that can lead to escalation along the conflict spectrum by building facilities through civic action projects.
>
> Second, insure that the infrastructure required to fight a LIC (airfields, basic infrastructure) is available in the region--either through host

country construction, or U.S. financed construction by civilian firms or military engineers.

Finally, conduct exercises in the area so everyone can become familiar with the local environment, local procedures, and the tasks they would be expected to perform if a military response becomes necessary.

The engineers play a key role in each of these endeavors, and in fact are the lead in the first and second steps and benefit from exercises as much as the operators actually flying missions.

Civic Action Programs

Our forces play a role (in low intensity conflict) through civic action. The construction and restoration of infrastructure, the assisting of others in the improvement of their own lives, whether by restoring land, buildings, roads, digging wells, or helping provide medical and educational services are all very important...on our own terms we can compete with shovels and win.

-- Sec. Def. Caspar Weinberger, speech delivered at Fort McNair Conference on LIC. Washington D.C., 14 Jan 86

The importance of this effort for the host is obvious, but it is also important for us. As noted,

projects are tremendous training opportunities and provide an avenue to learn host country construction techniques, the use of local material, and the operation of existing utility systems. (11) In fact, civic action projects allow us to:

-- exercise a full range of skills,
-- train units under their own command and control,
-- build facilities that are normally constructed by civilian construction firms in the U.S., and
-- provide worthwhile training projects.

While the projects are extremely worthwhile, there is one major problem which must be solved. An extremely valuable study entitled, "Funding Engineering Operations in Countries Involved in Low Intensity Conflicts" highlights the problems associated with construction projects supporting exercises/civic action in Central America. The report notes that all exercise related construction must be funded by the Military Construction Program (MCP) and states that the most common funding errors are (1) using exercise O & M funds to finance military construction and (2) security assistance projects being improperly classified as training projects. (12)

The FY 87 MCP Appropriation Bill states exercise related construction must use funds from the Army's unspecified minor construction account...these funds will be used to pay for all exercise related construction. The GAO stated: (13)

DOD O&M appropriations may not be used to finance construction activities in support of joint combined exercises in Honduras.

DOD O&M funds may not be used for provision of civic action or humanitarian assistance.

The study provides excellent guidance for planners who have to deal with construction in foreign countries and have to determine whether projects are civic action, or whether the US or the host nation's military infrastructure is the greater beneficiary. One statement drawn from the report sums up the importance of this issue:

> If a major exercise in a developing country depends on the completion of a military construction project and funds from the appropriate military construction account are not available...the Commander must cancel or postpone the exercise. Failure to do so is both a violation of the Antideficiency Act and a federal crime. (14)

As noted in the AFIT thesis, this is not a new problem. However, it is one that must be solved if the completion of civic action projects is going to be a viable way to fight LIC.

Providing Needed Infrastructure

Many of the comments made in the civic action section of this chapter are appropriate here. Required infrastructure is normally provided in two ways:

First, by private contractors either through purely civic action projects, through facilities that have dual purposes, or through the construction of facilities solely to support a military operation. The work being done in Southwest Asia is the best example of this type of effort.

Second, by the construction of infrastructure in support of scheduled exercises. The best examples of this type of effort are some of the asphalt strips and cargo marshalling yards that have been constructed in Honduras. Gaining access to the airfield in Grenada does not quite fall into this category but the outcome is the same--required airfield pavements were made available.

The key to success in this area is to know what is already available and then develop plans that take those factors into consideration. The lessons learned in the Falklands and Grenada should be sufficient to make this point perfectly clear. Trying to find out if fuel is available, if the runway is big enough, if the utilities are available as the deployment gets underway is not an ideal situation. Another important aspect of this step is to have equipment prepositioned in the area. While this is not possible in every instance, it should be clear to any planner who wants to bring a large engineering force to a location that it is going to take a lot of airlift or a lot of

time if going by sea. What you have is probably what you are going to fight with.

Exercises

Conducting realistic exercises is probably the next best thing to being there. Lessons learned from previous exercises again highlight the importance of:

-- knowing the area and becoming familiar with local construction practices,

-- establishing procedures for the procurement of local material, equipment, and repair parts,

-- having the ability to speak the language and spend money as soon as you arrive, and

-- realizing how much time it is going to take to accomplish required tasks.

The engineers should feel some relief to know that the tasks they will be completing in a LIC are the same as the ones they are training for in a conventional war scenario. However, they should not become complacent because it should also be obvious that construction practices and construction materials will be different. Hopefully, they have also gathered that establishing and maintaining the utility systems will be one of the major tasks, and the need to utilize host country equipment is almost a certainty.

As for other lessons learned, it should come as no surprise to anyone that the other keys to success were:

-- initiative and flexibility, for the best laid plans will go amiss,

-- physical fitness will be extremely important, and

-- leadership, especially at the NCO and junior officer level, could easily spell the difference between winning and losing.

Finally, as the study of base development in a LIC environment concludes: "the review of after action reports is critical to future success and units have faced similar problems in various environments."(15) The report also states that lessons learned were not widely disseminated. I can only agree with both findings. The lessons learned in the exercises and contingencies referred to in this analysis have shown that there were many similarities. Furthermore, I found during my research that after action reports had either not been written or had not been distributed on a large scale.

Recommendations

The following recommendations are made from an engineer's perspective, fully realizing that it takes other players to put them into action. Political, as well as military, decisions have to be made and some very tough questions have to be answered before the resources that are needed to fight this type of war are allocated. The first step that must be taken is to realize that we are at war. This is one of the fundamental problems associated with low intensity conflict; i.e., we do not know when we are at war. That realization from both a political and military perspective must take place if we are going to obtain the resources to fight. The other fundamental problem is that low intensity conflict is a "funny" looking war and the weapons to combat it are not just guns, tanks, airplanes, and soldiers. This type of war is best fought by preventing it, then by providing force structure to deter it, then and only then, if all else fails, by using the military in its conventional role.

What is the first step? First an overall objective for the region must be formulated. Although the President's National Security Statement emphasizes the importance of the region, congressional commitment, which ultimately drives the resource allocation process, has not been made. If the resource battle can be won, and that is a big if, the

decision has to be made to allocate the funds to build the needed infrastructure.

I feel that history has shown, and that this analysis supports, that the best way to fight a low intensity war is:

First, increase the number and scope of civic action projects that are undertaken in the region. The funds must be allocated to specific projects that will show direct benefit for the people and not signed off for some other purpose. From an engineer's view these projects should include roads, utility systems, schools, and hospitals. However, construction is not the only type of civic action project that should be completed. Medical, agricultural, and business assistance should be provided, not to take over the country's programs but to *teach the people to help* themselves.

Second, in concert with that effort, steps to provide the infrastructure that can be used by the military, if needed, must also be provided. Care must be taken to insure that the facilities can benefit the host country. We can ill afford, and in some cases would not be allowed, to simply build a U.S. base.

Third, we must increase the military presence in the region. This can easily be a two edged sword and I am not suggesting a permanent presence. Efforts should be made to increase the number of exercises in the region.

This effort will provide valuable training, allow the military to become familiar with the region, and resolve many of the problems identified in previous deployments. The facilities discussed in the first two recommendations can be provided during these exercises. One of the major problems that must be resolved in this area is the funding procedures used to support exercises and civic action projects.

The implementation of these recommendations is extremely difficult at best. From a national perspective, it is going to require a strong statement of policy, it will require a commitment of resources, and it will require a shift in priority from the Central Europe and Southwest Asia regions. However, as execution of foreign policy becomes more costly, perhaps it is time to emphasize the regions closer to home.

The previous recommendations are certainly beyond the engineer's realm of control, and while they should help articulate the need for those actions, they will in fact have little impact on the decision to undertake those initiatives. However, there are several actions that the engineers should be taking right now to be better prepared. As noted in Chapter One, Prime BEEF teams are currently built around deploying with their parent wing. While this is certainly appropriate for the large scale deployments or theater war, entire teams will probably not be deployed at the low end of the spectrum of conflict. Therefore, it is

important to keep a flexible team structure that allows you to take subsets of the main team. Previous experience has shown that equipment operators and utility teams will be in the greatest demand. Electrical power production, both from generators and commercial services will be critical. More emphasis must be placed in this area. Stateside training must be expanded and all personnel should have some training on equipment. An area that needs additional emphasis is more training of active duty Prime BEEF teams. Ideally this training would include additional deployments to the Central America region. The experience gained by the Army Engineers and Reserve and Guard units is evidence of the importance of realistic training in the area. Short of this, the training conducted by the Engineering and Services Center at Tyndall AFB needs to incorporate the lessons learned and try to duplicate the Central American environment as much as possible.

The engineering tasks performed in the low intensity environment will mirror image the tasks that will be faced in a "larger" war. Current training should be sufficient for those facing a low intensity conflict. However, as noted earlier, power production, water production and equipment training need to be expanded. Exposure, from a classroom perspective, if nothing else, to different construction material and practices should also be expanded. Exercise after action reports highlight the importance of

using basic construction practices and tools of trade and these lessons should not be forgotten.

Every exercise, every contingency, has highlighted the importance of local purchase--whether it be construction material, spare parts, or equipment. The key to this effort, in a peacetime or contingency environment, is to establish contact with local suppliers via a contracting officer. Air Force engineers, supply, and contracting personnel must establish procedures to transition from a peacetime environment where local supplies and supply systems are available, to a wartime footing where required material can be "simply requested." This is not a simple issue, nor is it one that is black or white. In Grenada local contractors were utilized, in other low intensity conflicts local supplies may or may not be available. These problems deserve much attention. It is important to note that this same issue was highlighted in the AFIT thesis and remains an issue to this day. One additional concern that must be addressed is a change of equipment sets for this type of environment. Several of the exercises pointed out that our heavy equipment is not well-suited for the Central American environment. A short term solution to this problem is the rental or leasing of the appropriate equipment; however, the long term solution is a change in the vehicle authorization lists. The final issue in this area is the importance of having the ability to communicate with the local populace. In an exercise environment every

effort must be made to make sure one or more of the team members can speak the language. The long term solution to this problem is harder to solve. There must be more emphasis placed on foreign language capabilities of our armed forces.

Continued emphasis must be placed on preparing after action reports that delineate what went wrong, how problems were solved, and tricks of the trade. These reports should be forwarded to the Engineering and Services Center for analysis, and subsequent distribution to squadron readiness sections. Lessons learned should be incorporated into the Readiness Course at the School of Civil Engineering at Wright Patterson AFB, Ohio and the technical training courses at Sheppard AFB, Texas. In addition, the Prime BEEF training conducted at Tyndall AFB should incorporate the lessons learned.

The importance of physical fitness, initiative, and leadership was relearned in all of the exercises. Physical fitness is important for everyone. Several attempts to put teeth into this program have been taken and several squadrons have established physical fitness programs, but physical training needs to become institutionalized and an integral part of the engineer's readiness training. Leadership and initiative are even more important but more difficult to teach. It is imperative that base civil engineers allow company grade officers to lead Prime BEEF exercises, to be in charge of snow removal operations, and

to take charge of other tasks that allow them to practice leadership skills and work with the enlisted force. The emphasis currently being placed on a zonal maintenance concept, where officer engineers and workcenter personnel work together to maintain sections of base, should not only have a positive impact on peacetime responsibilities but also have applications in a wartime environment.

One of the problems faced by the British and to some extent the Americans was explosive ordinance disposal. Although the base civil engineer is not responsible for EOD, it will have a major impact on how, and when he can perform his mission--more work is needed in this area and civil engineers need to understand the roles and missions of their supporting EOD flight.

In Conclusion

Low intensity conflicts are a challenge--for the entire Air Force. A lot of time and effort is being expended to define low intensity conflict and to determine the Air Force role and how we will respond. The engineer needs to study and understand his role in this type of conflict. A National Guard public affairs officer, a reporter in civilian life, drew this conclusion after participating in an exercise in Honduras:

> I honestly believe that if we as an American people cower under our own fears and simply walk away from Honduras, I'll be back again, only this time as a war correspondant covering American soldiers dying in what was once the beautiful country of Honduras.(16)

We may not be fighting a conventional war in Central America but we ARE fighting a war. Hopefully, this study and others like it will help those fighting that war be better prepared.

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